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AN EXTRAORDINARY NEW MARITIME FLY.

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THERE have been established recently two new¹ families of flies, to which I have to add a third. In the case of two of these three new families the members show great divergence from the usual dipterous condition. The three genera of Wandolleck's new family, Stethopathidae, are wingless and are without halteres. The thorax is greatly reduced and the compound eyes are feebly developed. The mouth-parts are of the general sort possessed by the Nematocera, *i.e.*, a short lip-like labium without pseudo-tracheae, a distinct labrum, and a hypopharynx, but no mandibles nor maxillar lobes. Coquillet's new family, the Stenoxenidae, established for a single female fly, presents no such extraordinary characters as the Stethopathidae. "The shape and structure of the head, body, and legs, and the unusual development of the first antennal joint appear to indicate its nearest approach to the genus *Ceratopogon* of the family Chironomidae; but the venation as well as the general appearance of the insect is very different from anything now located in that family" (Coquillet).

There has come into my hands a number of specimens, 153 in all, of a fly which must prove of unusual interest to zoölogists and entomologists, both because of its peculiar habitat and of its extraordinary structural condition. This new fly can certainly not be ascribed to any known dipterous family; its affinities can only be determined in the most general way. I feel constrained to establish for it a new family, which may be called the Eretmopteridae.

The 153 specimens of the new form, 139 males and 13 females, and 1 female pupa, were collected on Dec. 27, 1898,

¹ Wandolleck, Bruno, "Die Stethopathidae, eine neue Dipteren-Familie," *Zool. Jahrb.* Bd. xi, pp. 412-441, Pls. XXV and XXVI. 1898.

Coquillet, D. W., "A New Dipterous Family Related to the Chironomidae," *Ent. News.* Vol. x, pp. 60 and 61 (figure). March, 1899.

by Mr. J. C. Brown, a student assistant in my laboratory, at Point Lobos, a rocky point on the Pacific Coast near Monterey, California. The flies, of which there were many ("thousands," says Mr. Brown), were resting or running on the surface of the ocean water of tide pools and had a tendency to gather in large numbers in "patches" and in "ball-like masses" on the water. None were seen below the surface, nor were any seen flying. They moved about on the surface of the water very rapidly. In the last week of March, 1899, I visited Point Lobos and searched carefully for the fly, examining the same tide pools on which

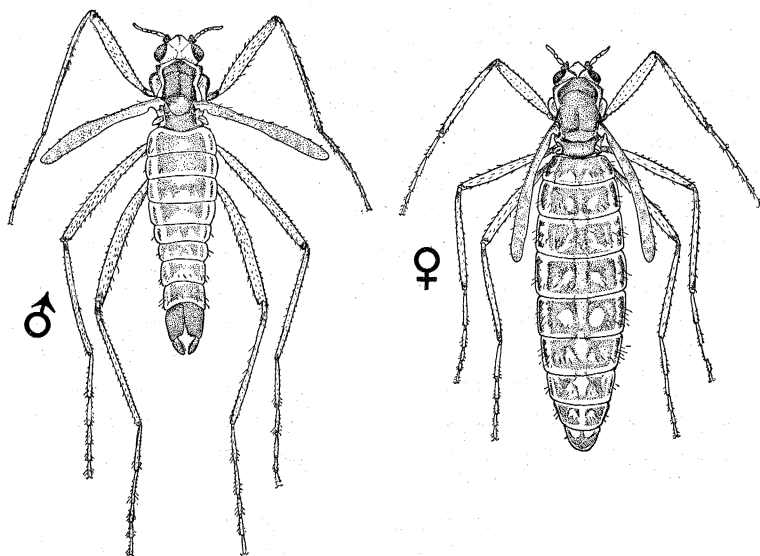


FIG. 1. — *Eretnoptera browni*; male and female.

Mr. Brown found his specimens; but no flies were to be found, nor were there any dipterous larvae or pupae in these pools. Mr. Brown also searched again in July and August without finding more specimens. So we have as yet no knowledge of the eggs and larvae, nor of the course of the life history of the fly.

The new form may be named and described as follows:

Eretnoptera browni nov. gen. et sp. — Male (Fig. 1). Length 2 mm. Head slightly broader than thorax; eyes widely separated, very small, very convex, hairy, and with rather large

facets; ocelli absent; antennae (Fig. 3, *ant.*) short, length 3 mm., 6-segmented, the basal segment wide and globose, the sixth segment longest, the second next, the third and fifth about equal, the fourth shortest, with a few short strong hairs on each segment, and the surface everywhere with a fine stiff pubescence. The mouth-parts are of simple nematocerous type, short, and with distinct labrum-epipharynx, maxillae, hypopharynx, and labium, mandibles absent; labrum-epipharynx (Fig. 2,

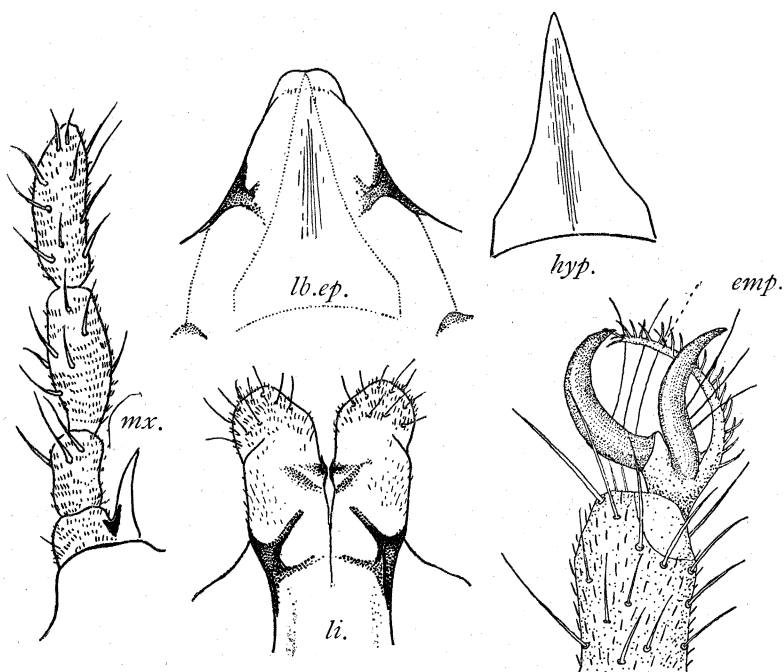


FIG. 2.—*Eretmoptera browni*: *mx.*, maxilla of male; *lb.ep.*, labrum-epipharynx of male; *li.*, labium of male; *hyp.*, hypopharynx of male; *emp.*, empodium of male.

lb.ep.) short, broadly triangular, with obtusely rounded tip; maxillae (Fig. 2, *mx.*) with short, weak, tapering, pointed lobe, and 4-segmented palpi, 3 mm. long; the palpi with last two segments longest and equal, and all the segments provided like the antennae with a few short stray hairs and a fine stiff pubescence; hypopharynx (Fig. 2, *hyp.*) elongate, triangular, as long as the labrum-epipharynx, but narrower and more acute; labium (Fig. 2, *li.*) short, lip-like, with free paraglossae, without pseudo-

tracheae. The face is whitish, with a median longitudinal dark line, and the antennary fossae with dark margins; the basal segment of the antenna is rather dark, the other segments pale. Thorax without bristles, dark above, pale beneath. Legs long and slender, whitish with blackish joints; middle and hind legs longest and equal, front legs only a little shorter; average measurement of middle leg, femur 1 mm., tibia 1 mm., tarsus 1 mm.; tarsus 5-segmented, segment 1 as long as segments 2, 3, and 4 together; segment 5 slightly longer than segment 4; tibiae of all legs with single apical spur; tarsal claws strongly curved, thickened at base, and with a few (three?) delicate spines on basal half; no pulvilli; empodium (Fig. 2, *emp.*) rather long, curving, filiform, and plumose or pectinate for its whole length. Wings narrow, strap-like, extending only to fourth abdominal segment, length .75 mm., and wholly without veins; whitish, somewhat wrinkled, and finely spinulose. These strange veinless wings are not specially thin or delicate, but, on the contrary, are rather thickened, the costal margin being especially thickened and perhaps folded. The halteres (Fig. 3, *h.*), or the structures which occupy the usual position of halteres, are not of the usual pedicel and knob type common among Diptera, but are minute, lobe-, or scale-like processes, appearing like rudiments of metathoracic wings; like the mesothoracic wings, they are rather thickened and are finely spinulose; they are widest at base and taper to a rounded tip; they average .08 mm. in length. Abdomen of nine segments, tapering gradually posteriorly; mottled gray and blackish above, lighter below, palest laterally; a few scattered, small, wholly inconspicuous hairs, the body appearing glabrous; external genitalia consisting of a pair of large, conspicuous, strong, articulated claspers (Fig. 3, *cl.*), which are covered with a pubescence.

Female (Fig. 1).—Length 2.5 mm., thus being one-fourth longer than the male; this extra length is all in the abdomen, which is markedly larger in every way than the abdomen of the male. The head and thorax are narrower than the robust abdomen, which is sub-cylindrical, tapering only slightly posteriorly. Eyes as in male very small, very widely separated, and hairy. Antennae (Fig. 3, *ant.*) only 4-segmented. Mouth-parts

essentially as in male, with, however, appreciable differences in shape; the labrum-epipharynx is narrower at base, and is more pointed apically; the labium with paraglossae separated farther back and slightly narrower. The reduced wings and halteres like those of male, the wings, length .85 mm., slightly longer. The abdomen consists of nine segments mottled blackish, with conspicuous white sutural spaces, caused by the distention of the abdomen. The external genitalia are inconspicuous. There is a short emarginate dorsal plate with rounded tips and a pair of small lateral processes. There appears to be no extrusible ovipositor.

Pupa of Female.—Among the many specimens collected by Mr. Brown, I find a single female pupa. This specimen throws the only light upon the condition of the immature life of the fly that we yet have. The pupa is of that simple unprotected, unmodified type characteristic of those flies, like the Cecidomyiidae and Mycetophilidae, whose pupae are protected by lying enclosed in plant tissue. There are no projecting breathing tubes like those of the aquatic pupae, and it would seem that the pupa was quite unfit for an aquatic life. And yet Mr. Brown took this pupa with the imagines from the surface of a tide pool. There is a puzzle here. The pupa may be described as follows: Length 2.5 mm. (as large as adult female). Immediately recognizable as pupa of the female from the similarity in size, shape, and markings. Abdomen just as in adult both as regards size, shape, color, and markings. The antennae, legs, and wings are folded on the lateral and ventral aspects of the anterior part of the body and extend backwards only to (hardly reaching) the posterior margin of the second abdominal segment. There are no external tracheal gills or elongated spiracles (breathing tubes). There are no bristles nor special clinging organs. The pupa is of a very simple, unmodified, unprotected type.

The “extraordinary” features of the external structure of the fly are the condition of the wings and halteres. The condition of the antennae and the empodium is also unusual. The reduction of the wings and loss of flight are accompanied by a reduction of the halteres, the flight-directing (?) organs. The

halteres being not wholly obsolete, but existing still in rudimentary condition, are especially suggestive in their likeness to rudimentary wings. The general affinities of the fly are shown by the character of the mouth-parts (and pupa) to be with the simpler nematocerous families. The habitat is unusual, but of course not unique. The discovery of the conditions of life of the immature stages may, however, give the matter of habi-

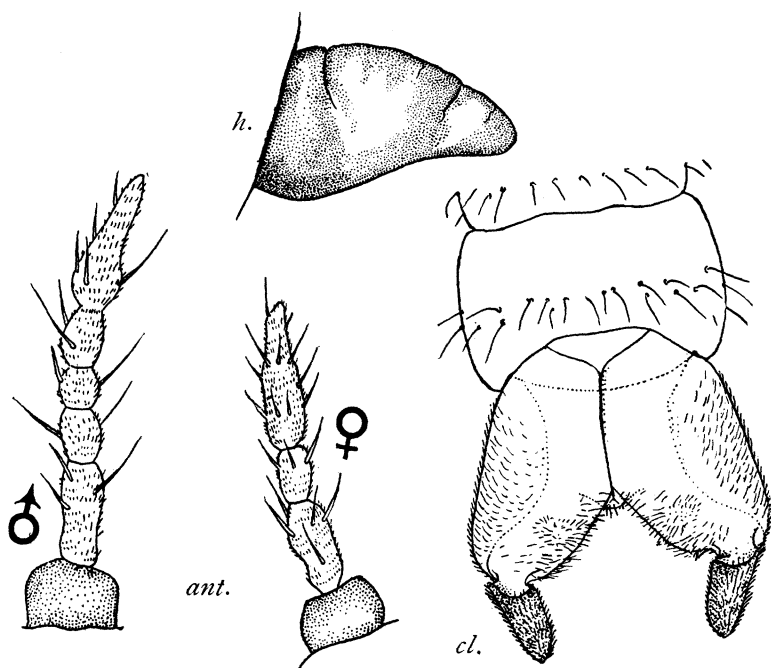


FIG. 3. — *Eretmoptera browni*: ant., antennae of male and female; h., balancer of male; cl., claspers of male.

tat a very great interest. The fact that the imagines are unable to fly is to be remembered in connection with their presence on the tide pools. Are the thickened strap-like reduced wings used in locomotion at all?

Other tide-pool flies are known. Various winged forms are common at the verge of the water and must become accustomed to occasional watery overwhelmings. Wheeler¹ has

¹ Wheeler, W. M., "A Genus of Maritime Dolichopodidae New to America," *Proc. Cal. Acad. Sci.*, 3d series. Vol. i, pp. 145-152, Pl. IV. 1897.

described three species of Dolichopodidae which he found "flitting about in the spray of the breakers among the seaweeds on the rocks below high-water mark." Eaton, and later Verrall,¹ describe certain flies from the Kerguelen Islands which live on the verge of the tide. One of these forms, *Halirytus amphibius*, assigned to the Chironomidae, has 6-segmented antennae and rudimentary wings "reaching to the apex of the first abdominal segment." But it has but 2-segmented palpi, and the halteres are of the usual form. It was found "walking upon the surface of puddles and tide pools." And many of the flies were undoubtedly occasionally submerged at high tide, although none was seen under water.

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¹ Verrall, in *Phil. Trans. Royal Soc.* Vol. clxxxvi, p. 247, Pl. XIV, Fig. 6. London, 1879.